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Scientists, Engineers, and Technicians in Trade and Regulated Industries: 1991

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Detailed Statistical Tables

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Scientists, Engineers, and Technicians in Trade and Regulated Industries: 1991

Project Director: Joseph P. Gannon

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Detailed Statistical Tables

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This report was prepared in the Division of Science Resources Studies (SRS) by Joseph P. Gannon, Science Resources Analyst, Science and Engineering Personnel Program (PER), under the general direction of Carolyn F. Shettle, Program Director, PER. Secretarial and other support services were provided by Simone Keith. The report was reviewed by Richard E. Morrison, Senior Economist, SRS, who currently is responsible for SRS involvement with the Occupational Employment Statistics (OES) survey. The Editorial Assistant was Julia H. Harriston, Publications Unit, SRS. Contracted editorial assistance services were provided by Wendy Osborne, Senior Editor, The Kevric Company. Kenneth M. Brown, Director, SRS, provided overall guidance.

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General Notes

In this report, estimates are presented of the total numbers of scientists, engineers, and technicians who were employed in trade and regulated industries in 1991. The estimates were developed from the U.S. Department of Labor's Occupational Employment Statistics (OES) Survey, a Federal/State program that produces national and State estimates of employment by industry for nonfarm wage and salary workers. The Bureau of Labor Statistics (BLS) has the primary responsibility for developing OES Survey procedures and providing technical guidance and assistance with survey problems. State Employment Security Agencies implement the survey at State levels and prepare current and projected employment statistics for these labor markets. Some States also prepare sub-State estimates.

The National Science Foundation (NSF) has enhanced the BLS effort since 1977 by financing the collection of full details on the types of scientific and technical jobs filled by industry. Analysis of this information provides insight into the dynamics of the labor market.

Requests for previously published data and additional information should be addressed to

Joanne P. Streeter
National Science Foundation
1800 G Street, NW, Room L-609
Washington, DC 20550
202-634-4664

Detailed Statistical Tables

NOTE: Industries identified in the tables of this report are from the "Numerical List of Short Titles" in the *Standard Industrial Classification (SIC) Manual*, revised 1987 edition. Tables 6 through 9 are new tables covering research and development personnel.

Table 1. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries, by detailed industry of employment: 1991

[Filled jobs in thousands]

Page 1 of 5

Detailed industry	Total SET personnel		Scientists		Engineers		Technicians		SET personnel managers	
	Number	Pct	Number	Pct	Number	Pct	Number	Pct	Number	Pct
Total trade and regulated	512.6	100.0	63.9	100.0	155.0	100.0	258.9	100.0	34.8	100.0
Transportation and public utilities	254.4	49.6	32.7	51.1	79.6	51.4	123.6	47.7	18.5	53.1
Transportation	33.2	6.5	9.6	15.0	7.6	4.9	13.4	5.2	2.6	7.5
Railroad transportation	3.4	0.7	0.5	0.8	0.8	0.5	1.8	0.7	0.3	0.9
Local and interurban transit	0.3	.1	.1	.2	<	<	0.2	.1	<	.1
Local and suburban transportation	.1	<	<	.1	<	<	.1	<	<	.1
Taxicabs	<	<	.0	.0	.0	.0	<	<	.0	.0
Intercity and rural bus	.1	<	.1	.1	.0	.0	.1	<	.0	.0
Bus charter service	<	<	.0	.0	.0	.0	<	<	.0	.0
School buses	<	<	<	<	<	<	.0	.0	.0	.0
Trucking and warehousing	4.7	.9	1.4	2.1	.8	.5	2.0	.8	.6	1.6
Trucking and courier services, excluding air	4.2	.8	1.2	1.9	.6	.4	1.9	.7	.5	1.4
Public warehousing and storage	.5	.1	.1	.2	.1	.1	.2	.1	.1	.2
Trucking terminal facilities	<	<	<	<	.0	.0	.0	.0	.0	.0
Water transportation	2.2	.4	.3	.5	1.3	.9	.4	.1	.2	.5
Deep sea foreign transportation of freight	.7	.1	.1	.2	.4	.3	.1	<	.1	.2
Deep sea domestic transportation of freight	.2	<	.1	.1	.1	.1	<	<	<	.1
Water transportation of freight, n.e.c.	.2	<	<	.1	.1	.1	<	<	<	.1
Water transportation of passengers	.3	.1	.1	.1	.1	.1	.1	<	<	.1
Water transportation services	.8	.2	.1	.1	.6	.4	.1	<	<	.1
Air transportation	16.7	3.3	5.8	9.1	3.6	2.3	6.2	2.4	1.1	3.2
Air transportation, scheduled	14.8	2.9	5.6	8.8	2.9	1.9	5.3	2.1	1.0	2.9
Air transportation, nonscheduled	.3	.1	.1	.1	.2	.1	.0	.0	.0	.0
Airports, flying fields, and services	1.6	.3	.1	.2	.5	.3	.9	.3	.1	.3
Pipelines, except natural gas	2.5	.5	.3	.4	.9	.6	1.3	.5	.1	.2

See explanatory information and SOURCE at end of table.

Table 1. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries, by detailed industry of employment: 1991

[Filled jobs in thousands]

Page 2 of 5

Detailed industry	Total SET personnel		Scientists		Engineers		Technicians		SET personnel managers	
	Number	Pct	Number	Pct	Number	Pct	Number	Pct	Number	Pct
Transportation--continued:										
Transportation services	3.3	0.6	1.2	1.9	0.2	0.1	1.6	0.6	0.3	1.0
Passenger transportation arrangements	1.6	.3	0.6	1.0	<	<	0.8	.3	.2	0.5
Freight transportation arrangements	1.3	.2	.4	0.7	.1	<	.7	.3	.1	.3
Rental of railroad cars	0.3	.1	.1	.1	.1	<	.1	<	.1	.1
Miscellaneous transportation services	.2	<	.1	.1	.1	<	.1	<	<	.1
Communications	108.5	21.2	9.1	14.2	30.3	19.5	61.3	23.7	7.9	22.8
Telephone communications	62.0	12.1	8.0	12.6	22.6	14.6	25.9	10.0	5.5	15.7
Telegraph and other communications	1.3	.3	.1	.2	.4	.3	.7	.3	.1	.3
Radio and television broadcasting	30.0	5.9	.5	.8	2.1	1.3	26.1	10.1	1.4	3.9
Cable and other pay TV services	7.8	1.5	.2	.3	1.2	.7	5.8	2.2	.6	1.8
Communications services, n.e.c.	7.4	1.4	.2	.3	4.0	2.6	2.8	1.1	.4	1.2
Electric, gas, and sanitary services	112.6	22.0	14.0	21.9	41.8	26.9	48.9	18.9	7.9	22.8
Electric services	64.8	12.6	6.3	9.9	25.0	16.1	29.4	11.4	4.1	11.8
Gas production and distribution	13.8	2.7	2.8	4.3	3.2	2.0	6.5	2.5	1.4	4.0
Combination utility services	27.3	5.3	3.5	5.6	12.0	7.7	10.8	4.2	1.0	2.8
Water supply	1.3	.3	.2	.3	.4	.3	.5	.2	.2	.6
Sanitary services	5.2	1.0	1.2	1.9	1.1	.7	1.6	.6	1.2	3.6
Steam and air-conditioning supply	.1	<	<	<	.1	<	<	<	<	.1
Irrigation systems	<	<	.0	.0	<	<	<	<	<	<
Wholesale and retail trade	258.2	50.4	31.2	48.9	75.4	48.6	135.3	52.3	16.3	46.9
Wholesale trade	226.7	44.2	22.2	34.8	69.8	45.0	121.4	46.9	13.3	38.2
Wholesale trade, durable goods	197.4	38.5	15.1	23.6	65.5	42.3	105.7	40.8	11.0	31.8
Motor vehicles, parts, and supplies	3.7	.7	.4	.6	1.1	.7	1.9	.7	.4	1.1
Furniture and home furnishings	1.3	.3	.1	.2	.2	.1	.9	.3	.1	.2
Lumber and construction materials	1.8	.3	.2	.3	.3	.2	1.1	.4	.1	.4
Professional and commercial equipment	106.4	20.8	10.4	16.2	35.8	23.1	53.7	20.8	6.5	18.8

See explanatory information and SOURCE at end of table.

Table 1. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries, by detailed industry of employment: 1991

[Filled jobs in thousands]

Detailed industry	Total SET personnel		Scientists		Engineers		Technicians		SET personnel managers	
	Number	Pct	Number	Pct	Number	Pct	Number	Pct	Number	Pct
Wholesale trade--continued:										
Metals and minerals, except petroleum	1.8	0.3	0.2	0.3	0.3	0.2	1.1	0.4	0.1	0.3
Electrical goods	48.4	9.4	2.1	3.3	15.3	9.9	28.9	11.2	2.1	6.0
Hardware, plumbing, and heating equipment	5.8	1.1	.3	.4	2.4	1.5	2.9	1.1	.3	.8
Machinery, equipment, and supplies	25.1	4.9	1.0	1.6	9.7	6.3	13.0	5.0	1.3	3.7
Miscellaneous durable goods	3.0	.6	.3	.5	.4	.3	2.2	.8	.1	.4
Wholesale trade, nondurable goods	29.4	5.7	7.2	11.2	4.3	2.8	15.6	6.0	2.2	6.4
Paper and paper products	1.9	.4	.4	.6	.2	.2	1.1	.4	.1	.4
Drugs, proprietaries, and sundries	3.6	.7	1.0	1.6	.4	.2	1.9	.7	.3	.9
Apparel, piece goods, and notions	1.7	.3	.3	.5	.2	.1	1.0	.4	.1	.3
Groceries and related products	6.1	1.2	1.4	2.2	.5	.3	3.6	1.4	.6	1.7
Farm-product raw materials	0.5	.1	.1	.1	.1	<	0.3	.1	<	.1
Chemicals and allied products	6.1	1.2	1.6	2.4	1.6	1.0	2.5	1.0	.4	1.1
Petroleum and petroleum products	3.2	.6	.7	1.0	1.0	.6	1.4	.5	.2	.6
Beer, wine, and distilled beverages	.6	.1	.1	.2	<	<	.4	.2	<	.1
Miscellaneous nondurable goods	5.7	1.1	1.6	2.5	.3	.2	3.3	1.3	.4	1.2
Retail trade	31.5	6.1	9.0	14.1	5.6	3.6	13.9	5.4	3.0	8.7
Building materials and garden supplies	2.5	.5	.5	.8	.3	.2	1.6	.6	.1	.3
Lumber and other building materials	1.9	.4	.3	.4	.2	.1	1.4	.5	.1	.3
Paint, glass, and wallpaper stores	.1	<	<	.1	<	<	.1	<	.0	.0
Hardware stores	.2	<	.1	.2	<	<	<	<	.0	.0
Retail nurseries and garden stores	.2	<	<	<	<	<	.1	.1	.0	.0
General merchandise stores	7.8	1.5	2.9	4.6	1.7	1.1	2.3	.9	1.0	2.9

See explanatory information and SOURCE at end of table.

Table 1. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries, by detailed industry of employment: 1991

[Filled jobs in thousands]

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Detailed industry	Total SET personnel		Scientists		Engineers		Technicians		SET personnel managers	
	Number	Pct	Number	Pct	Number	Pct	Number	Pct	Number	Pct
Retail trade--continued:										
Department stores	7.3	1.4	2.8	4.4	1.6	1.1	1.9	0.7	1.0	2.8
Variety stores	0.2	<	<	<	0.0	0.0	0.1	.1	<	0.1
Miscellaneous general merchandise stores	.4	0.1	0.1	0.2	<	<	.2	.1	<	.1
Food stores	2.0	.4	.8	1.3	.1	.1	.8	.3	0.2	.6
Grocery stores	2.0	.4	.8	1.3	.1	.1	.8	.3	.2	.6
Meat and fish markets	<	<	<	<	.0	.0	.0	.0	.0	.0
Fruit and vegetable markets	<	<	<	<	.0	.0	.0	.0	.0	.0
Retail bakeries	<	<	<	<	.0	.0	.0	.0	.0	.0
Miscellaneous food stores	<	<	<	<	.0	.0	.0	.0	.0	.0
Automotive dealers and service stations	.7	.1	.1	.2	.2	.1	.4	.1	<	.1
New and used car dealers	.1	<	<	<	<	<	<	<	.0	.0
Auto and home supply stores	.2	<	<	.1	.1	.1	.1	<	<	<
Gasoline service stations	.3	.1	.1	.1	.1	<	.2	.1	<	<
Boat dealers	<	<	<	<	.0	.0	<	<	.0	.0
Automotive dealers, n.e.c.	.1	<	<	<	<	<	<	<	.0	.0
Apparel and accessory stores	1.6	.3	.6	.9	<	<	.8	.3	.1	.4
Men's and boys' clothing stores	.1	<	<	.1	.0	.0	<	<	<	<
Women's clothing stores	.3	.1	.1	.2	.0	.0	.1	.1	<	.1
Women's accessory and specialty stores	.1	<	<	<	.0	.0	<	<	.0	.0
Children's and infants' wear stores	.1	<	<	.1	.0	.0	<	<	.0	.0
Family clothing stores	.7	.1	.2	.4	<	<	.3	.1	.1	.2
Shoe stores	.4	.1	.1	.2	.0	.0	.2	.1	<	<
Miscellaneous apparel and accessory stores	.1	<	<	<	<	<	.1	<	.0	.0
Furniture and home furnishings stores	8.2	1.6	1.7	2.7	1.8	1.2	4.2	1.6	.5	1.6
Furniture and home furnishings stores	.8	.1	.1	.2	<	<	.6	.2	<	.1

See explanatory information and SOURCE at end of table.

Table 1. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries, by detailed industry of employment: 1991

[Filled jobs in thousands]

Page 5 of 5

Detailed industry	Total SET personnel		Scientists		Engineers		Technicians		SET personnel managers	
	Number	Pct	Number	Pct	Number	Pct	Number	Pct	Number	Pct
Retail trade--continued:										
Household appliance stores........	0.3	0.1	0.2	0.3	<	<	0.1	<	<	0.1
Radio, television, and computer stores..........................	7.1	1.4	1.4	2.2	1.8	1.1	3.5	1.4	0.5	1.4
Eating and drinking places..........	1.8	.4	.4	.6	0.4	0.2	.8	0.3	.3	.9
Miscellaneous retail stores.........	6.8	1.3	1.9	3.0	1.1	.7	3.0	1.2	.7	2.0
Drug stores and proprietary stores..........................	.8	.1	.3	.4	<	<	.4	2.1	.1	.3
Liquor stores.....................	<	<	<	<	.0	.0	<	<	.0	.0
Used merchandise stores...........	.1	<	<	<	<	<	<	<	.0	.0
Miscellaneous shopping goods stores..........................	1.3	.2	.2	.4	.2	.1	.7	.3	.1	.4
Nonstore retailers................	3.1	.6	1.3	2.0	.3	.2	1.2	.5	.4	1.2
Fuel dealers......................	.2	<	<	.1	.1	<	.1	<	<	<
Retail stores, n.e.c..............	1.3	.3	.1	.1	.5	.3	.7	.3	<	.1

NOTE: Because of rounding, components may not add to totals.

KEY: < = The estimated actual value is less than 50 for numbers and less than 0.05 for percents.
0 = Data were collected and the reported number or value was zero.
n.e.c. = not elsewhere classified

SOURCE: National Science Foundation/SRS, using data from U.S. Department of Labor/Bureau of Labor Statistics, Occupational Employment Statistics Survey

Table 2. Scientists in trade and regulated industries, by broad industry group of employment and detailed occupation: 1991

[Filled jobs in thousands]

Page 1 of 1

Broad industry group of employment	Total	Physical	Mathematical	Life	Social	Computer
Total trade and regulated	63.5	5.7	2.7	2.6	1.3	51.1
Transportation and public utilities	32.5	3.2	2.7	0.9	1.3	24.3
Transportation	9.5	0.4	2.0	.1	0.0	7.0
Railroad transportation	0.5	<	0.0	<	.0	0.4
Local and interurban transit	.1	.0	.0	.0	.0	.1
Trucking and warehousing	1.4	.1	.0	<	.0	1.2
Water transportation	.3	<	.0	<	.0	.3
Air transportation	5.7	.1	2.0	<	.0	3.6
Pipelines, except natural gas	.3	.1	.0	<	.0	.2
Transportation services	1.2	.1	.0	.0	.0	1.1
Communications	9.1	<	.0	<	.7	8.4
Electric, gas, and sanitary services	13.9	2.7	.7	.8	.7	9.0
Wholesale and retail trade	31.0	2.5	.0	1.7	.0	26.8
Wholesale trade	22.3	2.5	.0	1.7	.0	18.2
Wholesale trade, durable goods	15.1	.5	.0	.5	.0	14.2
Wholesale trade, nondurable goods	7.2	2.0	.0	1.2	.0	4.0
Retail trade	8.7	.1	.0	<	.0	8.6
Building materials and garden supplies	.4	<	.0	<	.0	.3
General merchandise stores	2.9	.0	.0	.0	.0	2.9
Food stores	.8	.0	.0	.0	.0	.8
Automotive dealers and service stations	.1	<	.0	.0	.0	.1
Apparel and accessory stores	.6	.0	.0	.0	.0	.6
Furniture and home furnishings stores	1.6	.0	.0	.0	.0	1.6
Eating and drinking places	.4	.0	.0	.0	.0	.4
Miscellaneous retail stores	1.9	.0	.0	.0	.0	1.9

NOTE: Because of rounding, components may not add to totals.

KEY: < = The estimated actual value is less than 50.

0 = Data were collected and the reported number or value was zero.

SOURCE: National Science Foundation/SRS, using data from U.S. Department of Labor/Bureau of Labor Statistics, Occupational Employment Statistics Survey

Table 3. Engineers in trade and regulated industries, by broad industry group of employment and detailed occupation: 1991

[Filled jobs in thousands]

Page 1 of 1

Broad industry group of employment	Total	Aero-nau-tical	Civil	Elec-trical/elec-tronics	Computer	Mechan-ical	Indus-trial	Sales	Other
Total trade and regulated	155.0	0.7	5.4	71.5	2.9	12.1	4.3	17.9	40.2
Transportation and public utilities	79.6	.7	5.4	35.0	2.9	4.9	4.3	0.0	26.5
Transportation	7.6	.7	0.2	0.6	0.6	0.3	0.9	.0	4.3
Railroad transportation	0.8	.0	.0	.0	.0	.0	.0	.0	0.8
Local and interurban transit	<	.0	<	.0	.0	.0	.0	.0	.0
Trucking and warehousing	.8	.0	.0	.0	.0	.0	.0	.0	.8
Water transportation	1.3	.0	.0	.0	.0	.1	.0	.0	1.2
Transportation by air	3.6	.7	.0	.5	.6	.0	.9	.0	1.0
Pipelines, except natural gas	.9	.0	.2	.1	.0	.2	.0	.0	.4
Transportation services	.2	.0	.0	.0	.0	.0	.0	.0	.2
Communications	30.3	.0	1.2	17.4	1.3	.8	1.2	.0	8.4
Electric, gas, and sanitary services	41.7	.0	4.0	17.0	1.0	3.8	2.1	.0	13.8
Wholesale and retail trade	75.3	.0	.0	36.5	.0	7.2	.0	17.9	13.7
Wholesale trade	69.8	.0	.0	34.7	.0	6.8	.0	16.1	12.2
Wholesale trade, durable goods	65.5	.0	.0	34.4	.0	6.1	.0	14.6	10.5
Wholesale trade, nondurable goods	4.3	.0	.0	.3	.0	.8	.0	1.5	1.8
Retail trade	5.5	.0	.0	1.8	.0	.3	.0	1.8	1.5
Building materials and garden supplies	.3	.0	.0	.0	.0	<	.0	.2	.1
General merchandise stores	1.7	.0	.0	.3	.0	.1	.0	.5	.7
Food stores	.1	.0	.0	<	.0	<	.0	<	.1
Automotive dealers and service stations	.1	.0	.0	.0	.0	<	.0	.0	.1
Apparel and accessory stores	<	.0	.0	.0	.0	<	.0	.0	<
Furniture and home furnishings stores	1.8	.0	.0	1.0	.0	<	.0	.5	.3
Eating and drinking places	.4	.0	.0	.0	.0	.0	.0	.3	.1
Miscellaneous retail stores	1.1	.0	.0	.5	.0	.1	.0	.3	.3

NOTE: Because of rounding, components may not add to totals.

KEY: < = The estimated actual value is less than 50.
0 = Data were collected and the reported number or value was zero.

SOURCE: National Science Foundation/SRS, using data from U.S. Department of Labor/Bureau of Labor Statistics, Occupational Employment Statistics Survey

Table 4. Technicians in trade and regulated industries, by broad industry group of employment and detailed occupation: 1991

[Filled jobs in thousands]

Page 1 of 2

Broad industry group of employment	Total	Job Category			Engineering				
					Total	Job Category			
		Computer programmer	Drafter	Science		Electrical/electronics	Mechanical	Civil	Other
Total trade and regulated........	259.3	68.9	22.7	8.2	159.4	89.0	5.9	2.5	62.0
Transportation and public utilities..	123.7	19.8	16.1	3.9	83.9	25.2	2.6	2.5	53.7
Transportation.....................	13.5	7.2	0.2	0.3	5.8	1.7	0.2	0.1	3.8
Railroad transportation..........	1.8	0.3	.0	.0	1.5	0.0	.0	.1	1.4
Local and interurban transit.....	0.2	.2	.0	.0	0.0	.0	.0	.0	0.0
Trucking and warehousing.........	2.0	2.0	.0	<	.0	.0	.0	.0	.0
Water transportation.............	.4	.4	.0	.0	.0	.0	.0	.0	.0
Air transportation...............	6.3	2.8	.0	<	3.4	1.4	.0	.0	2.0
Pipelines, except natural gas....	1.3	.1	.2	.2	.8	.2	.2	<	.4
Transportation services..........	1.6	1.5	.0	.1	.0	.0	.0	.0	.0
Communications.....................	61.3	6.8	5.5	.0	49.0	13.2	.2	1.0	34.6
Electric, gas, and sanitary services.........................	48.9	5.7	10.4	3.6	29.2	10.4	2.2	1.3	15.2
Wholesale and retail trade...........	135.6	49.2	6.6	4.3	75.5	63.8	3.3	.0	8.4
Wholesale trade....................	121.4	39.6	4.7	4.2	72.9	62.3	3.1	.0	7.5
Wholesale trade, durable goods...	105.7	31.3	4.1	.6	69.8	60.8	2.7	.0	6.2
Wholesale trade, nondurable goods..........................	15.6	8.3	.6	3.6	3.1	1.5	.4	.0	1.3
Retail trade.......................	14.2	9.6	2.0	.1	2.6	1.5	.2	.0	.9
Building materials and garden supplies.......................	1.7	.5	1.1	<	.1	.1	<	.0	.1
General merchandise stores.......	2.3	1.5	.2	.0	.6	.4	.1	.0	.1
Food stores......................	.9	.7	.1	<	.1	.0	.0	.0	.1
Automotive dealers and service stations.......................	.4	.2	.0	.0	.2	<	.1	.0	.1
Apparel and accessory stores.....	.8	.7	.1	.0	<	.0	.0	.0	<

See explanatory information and SOURCE at end of table.

Table 4. Technicians in trade and regulated industries, by broad industry group of employment and detailed occupation: 1991

[Filled jobs in thousands]

Page 2 of 2

Broad industry group of employment	Total	Job Category			Engineering				
						Job Category			
		Computer programmer	Drafter	Science	Total	Electrical/ electronics	Mechanical	Civil	Other
Retail trade--continued:									
Furniture and home furnishings stores	4.4	3.3	0.3	0.0	0.8	0.5	0.0	0.0	0.3
Eating and drinking places	0.8	0.7	<	<	.0	.0	.0	.0	.0
Miscellaneous retail stores	3.0	2.1	.2	<	.7	.5	<	.0	.2

NOTE: Because of rounding, components may not add to totals.

KEY: < = The estimated actual value is less than 50.
0 = Data were collected and the reported number or value was zero.

SOURCE: National Science Foundation/SRS, using data from U.S. Department of Labor/Bureau of Labor Statistics, Occupational Employment Statistics Survey

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

Page 1 of 32

Industry and occupation	Total	Percentage of total industry employment	Relative error
Railroads (SIC 4010):			
Scientific and technical personnel	3,390	1.2	nc
Scientists	490	0.2	nc
Physical scientists	40	<	0
Life scientists	20	.0	0
Computer analysts	430	.1	0
Engineers	800	.3	nc
Other, n.e.c	800	.3	nc
Technicians	1,780	.6	nc
Computer programmers	270	.1	0
Civil engineering technicians	70	<	0
All other engineering technicians	1,440	.5	nc
Managers of scientific and technical personnel	320	.1	0
Local and suburban transportation (SIC 4110):			
Scientific and technical personnel	150	.1	nc
Scientists	40	<	0
Computer analysts	40	<	0
Engineers	10	.0	nc
Civil engineers	10	.0	5
Technicians	80	.1	12
Computer programmers	80	.1	12
Managers of scientific and technical personnel	20	<	0
Taxicabs (SIC 4120):			
Scientific and technical personnel	10	<	nc
Technicians	10	<	0
Computer programmers	10	<	0
Intercity and rural bus transportation (SIC 4130):			
Scientific and technical personnel	130	.5	nc
Scientists	50	.2	nc
Computer analysts	50	.2	nc
Technicians	80	.3	0
Computer programmers	80	.3	0

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

Page 2 of 32

Industry and occupation	Total	Percentage of total industry employment	Relative error
Bus charter service (SIC 4140):			
Scientific and technical personnel	10	0.1	nc
Technicians	10	<	7
Computer programmers	10	<	7
School buses (SIC 4150):			
Scientific and technical personnel	20	<	nc
Scientists	10	.0	nc
Computer analysts	10	.0	nc
Engineers	10	<	nc
Other, n.e.c.	10	<	nc
Trucking and courier services, excluding air (SIC 4210):			
Scientific and technical personnel	4,180	.3	nc
Scientists	1,220	.1	nc
Physical scientists	120	.0	66
Life scientists	10	.0	55
Computer analysts	1,090	.1	12
Engineers	640	<	2
Technicians	1,850	.1	nc
Computer programmers	1,820	.1	24
Physical and life science technicians	30	.0	71
Managers of scientific and technical personnel	470	<	7
Public warehousing and storage (SIC 4220):			
Scientific and technical personnel	520	.4	nc
Scientists	130	.1	nc
Physical scientists	20	<	34
Computer analysts	110	.1	17
Engineers	150	.1	20
Technicians	160	.1	nc
Computer programmers	150	.1	2
Physical and life science technicians	10	.0	34
Managers of scientific and technical personnel	80	.1	10
Trucking terminal facilities (SIC 4230):			
Scientific and technical personnel	20	.4	nc

See explanatory information and SOURCE at end of table.

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Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

Page 3 of 32

Industry and occupation	Total	Percentage of total industry employment	Relative error
Trucking terminal facilities (SIC 4230)--continued:			
Scientists	20	0.4	nc
Computer analysts	20	.4	nc
Deep sea foreign transportation of freight (SIC 4410):			
Scientific and technical personnel	690	3.4	nc
Scientists	110	.6	0
Computer analysts	110	.6	0
Engineers	400	2.0	nc
Marine engineers	260	1.2	2
Other, n.e.c	140	.7	nc
Technicians	100	.5	nc
Computer programmers	100	.5	0
Managers of scientific and technical personnel	80	.4	2
Deep sea domestic transportation of freight (SIC 4420):			
Scientific and technical personnel	250	2.2	nc
Scientists	50	.5	nc
Computer analysts	50	.5	nc
Engineers	140	1.2	nc
Marine engineers	90	.8	0
Other, n.e.c	50	.4	nc
Technicians	40	.4	0
Computer programmers	40	.4	0
Managers of scientific and technical personnel	20	.2	0
Water transportation of freight, n.e.c. (SIC 4440):			
Scientific and technical personnel	190	1.2	nc
Scientists	40	.3	nc
Computer analysts	40	.3	nc
Engineers	110	.7	nc
Marine engineers	70	.5	0
Other, n.e.c	40	.2	nc

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

Page 4 of 32

Industry and occupation	Total	Percentage of total industry employment	Relative error
Water transportation of freight, n.e.c. (SIC 4440)--continued:			
Technicians	20	0.1	0
Computer programmers	20	.1	0
Managers of scientific and technical personnel	20	.1	0
Water transportation of passengers (SIC 4480):			
Scientific and technical personnel	300	1.7	nc
Scientists	80	.4	nc
Life scientists	20	.1	0
Computer analysts	60	.4	0
Engineers	80	.4	nc
Marine engineers	70	.4	0
Other, n.e.c	10	.1	nc
Technicians	100	.6	0
Computer programmers	100	.6	0
Managers of scientific and technical personnel	40	.2	0
Water transportation services (SIC 4490):			
Scientific and technical personnel	800	.7	nc
Scientists	50	<	nc
Physical scientists	10	<	0
Computer analysts	40	<	3
Engineers	600	.5	nc
Marine engineers	520	.4	34
Other, n.e.c	80	.1	nc
Technicians	120	.1	nc
Computer programmers	120	.1	1
Managers of scientific and technical personnel	30	<	7
Air transportation, scheduled (SIC 4510):			
Scientific and technical personnel	14,850	2.4	nc
Scientists	5,630	.9	nc
Operations and systems researchers and analysts	1,970	.3	1
Physical scientists	80	<	0

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

Page 5 of 32

Industry and occupation	Total	Percentage of total industry employment	Relative error
Air transportation, scheduled (SIC 4510)--continued:			
Life scientists	10	0.0	0
Computer analysts	3,570	.6	<
Engineers	2,870	.5	nc
Aeronautical engineers	520	.1	1
Computer engineers	450	.1	0
Electrical/electronics engineers	330	.1	0
Industrial engineers	710	.1	1
Other, n.e.c.	860	.1	nc
Technicians	5,350	.9	nc
Computer programmers	2,690	.4	1
Electrical/electronics engineering technicians	1,080	.2	1
All other engineering technicians	1,570	.2	nc
Physical and life science technicians	10	.0	0
Managers of scientific and technical personnel	1,000	.2	1
Air transportation, nonscheduled (SIC 4520):			
Scientific and technical personnel	260	.9	nc
Scientists	70	.2	nc
Computer analysts	70	.2	nc
Engineers	190	.6	nc
Other, n.e.c.	190	.6	nc
Airports, flying fields, and services (SIC 4580):			
Scientific and technical personnel	1,590	1.5	nc
Scientists	100	.1	nc
Operations and systems researchers and analysts	40	<	0
Life scientists	20	<	0
Computer analysts	40	<	<
Engineers	520	.5	nc
Aeronautical engineers	80	.1	2
Industrial engineers	80	.1	10
Other, n.e.c.	360	.3	nc
Technicians	860	.8	nc
Computer programmers	80	.1	9
Electrical/electronics engineering technicians	350	.3	<
All other engineering technicians	430	.4	nc

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

Industry and occupation	Total	Percentage of total industry employment	Relative error
Airports, flying fields, and services (SIC 4580)--continued:			
Managers of scientific and technical personnel	110	0.1	4
Passenger transportation arrangements (SIC 4720):			
Scientific and technical personnel	1,580	.8	nc
Scientists	620	.3	nc
Physical scientists	20	.0	0
Computer analysts	600	.3	nc
Engineers	10	.0	0
Technicians	780	.4	2
Computer programmers	780	.4	2
Managers of scientific and technical personnel	170	.1	1
Freight transportation arrangements (SIC 4730):			
Scientific and technical personnel	1,260	.9	nc
Scientists	440	.3	6
Computer analysts	440	.3	6
Engineers	50	<	17
Technicians	660	.5	nc
Computer programmers	660	.5	9
Managers of scientific and technical personnel	110	.1	4
Rental of railroad cars (SIC 4740):			
Scientific and technical personnel	260	9.0	nc
Scientists	90	3.2	nc
Computer analysts	90	3.1	0
Engineers	70	2.5	0
Technicians	50	1.8	nc
Computer programmers	50	1.7	0
Managers of scientific and technical personnel	50	1.6	0

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

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Industry and occupation	Total	Percentage of total industry employment	Relative error
Miscellaneous transportation services (SIC 4780):			
Scientific and technical personnel	220	0.9	nc
Scientists	70	.3	nc
Physical scientists	60	.2	24
Computer analysts	10	.1	nc
Engineers	50	.2	27
Technicians	80	.3	nc
Computer programmers	10	<	0
Physical and life science technicians	70	.3	20
Managers of scientific and technical personnel	20	.1	29
Telephone communications (SIC 4810):			
Scientific and technical personnel	61,960	6.8	nc
Scientists	8,020	.9	nc
Social scientists	460	.1	1
Computer analysts	7,560	.8	2
Engineers	22,630	2.5	nc
Civil engineers	1,070	.1	7
Computer engineers	660	.1	4
Electrical/electronics engineers	13,120	1.4	2
Industrial engineers	1,120	.1	2
Mechanical engineers	320	<	6
Other, n.e.c.	6,340	.7	nc
Technicians	25,850	2.8	nc
Computer programmers	5,650	.6	2
Drafters	4,700	.5	3
Electrical/electronics engineering technicians	7,810	.9	5
Mechanical engineering technicians	70	.0	10
Civil engineering technicians	960	.1	5
All other engineering technicians	6,660	.7	nc
Managers of scientific and technical personnel	5,460	.6	4
Telegraph and other communications (SIC 4820):			
Scientific and technical personnel	1,330	12.3	nc
Scientists	100	.9	4
Computer analysts	100	.9	4
Engineers	400	3.8	nc
Computer engineers	130	1.2	23

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

Page 8 of 32

Industry and occupation	Total	Percentage of total industry employment	Relative error
Telegraph and other communications (SIC 4820)--continued:			
Electrical/electronics engineers	240	2.3	14
Other, n.e.c	30	0.3	nc
Technicians	730	6.7	nc
Computer programmers	120	1.1	9
Drafters	20	.1	0
Electrical/electronics engineering technicians	450	4.2	35
All other engineering technicians	140	1.3	nc
Managers of scientific and technical personnel	100	.9	14
Radio and television broadcasting (SIC 4830):			
Scientific and technical personnel	30,030	12.9	nc
Scientists	500	.2	nc
Physical scientists	20	.0	6
Social scientists	180	.1	74
Computer analysts	300	.1	1
Engineers	2,080	.9	nc
Computer engineers	80	<	16
Electrical/electronics engineers	1,500	.6	3
Industrial engineers	30	<	6
Mechanical engineers	160	.1	20
Other, n.e.c	310	.1	nc
Technicians	26,100	11.3	nc
Computer programmers	210	.1	8
Drafters	20	.0	0
Electrical/electronics engineering technicians	2,010	.9	5
Mechanical engineering technicians	60	<	0
Civil engineering technicians	30	<	12
All other engineering technicians	23,770	10.3	nc
Managers of scientific and technical personnel	1,350	.6	6
Cable and other pay TV services (SIC 4840):			
Scientific and technical personnel	7,790	6.0	nc
Scientists	220	.2	nc
Social scientists	30	<	13
Computer analysts	190	.1	2

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

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Industry and occupation	Total	Percentage of total industry employment	Relative error
Cable and other pay TV services (SIC 4840)--continued:			
Engineers	1,160	0.9	nc
Civil engineers	50	<	6
Computer engineers	90	.1	21
Electrical/electronics engineers	600	.5	6
Industrial engineers	60	<	13
Mechanical engineers	120	.1	3
Other, n.e.c	240	.2	nc
Technicians	5,790	4.5	nc
Computer programmers	250	.2	6
Drafters	530	.4	5
Electrical/electronics engineering technicians	1,940	1.5	7
All other engineering technicians	3,070	2.4	nc
Managers of scientific and technical personnel	620	.5	6
Communications services, n.e.c. (SIC 4890):			
Scientific and technical personnel	7,420	31.4	nc
Scientists	220	.9	nc
Physical scientists	10	<	0
Computer analysts	210	.9	0
Engineers	4,000	17.0	nc
Civil engineers	60	.2	0
Computer engineers	320	1.4	26
Electrical/electronics engineers	1,980	8.4	4
Industrial engineers	10	.1	0
Mechanical engineers	150	.7	0
Other, n.e.c	1,480	6.3	nc
Technicians	2,800	11.8	nc
Computer programmers	600	2.5	0
Drafters	210	.9	1
Electrical/electronics engineering technicians	960	4.0	4
Mechanical engineering technicians	70	.3	0
Civil engineering technicians	20	.1	0
All other engineering technicians	940	4.0	nc
Managers of scientific and technical personnel	400	1.7	<
Electric services (SIC 4910):			
Scientific and technical personnel	64,830	14.6	nc

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

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Industry and occupation	Total	Percentage of total industry employment	Relative error
Electric services (SIC 4910)--continued:			
Scientists	6,300	1.4	nc
All other mathematicians	380	0.1	<
Geologists, geophysicists, and earth scientists	110	<	5
All other physical scientists	800	.2	nc
Life scientists	520	.1	3
Social scientists	490	.1	1
Computer analysts	4,000	.9	1
Engineers	25,030	5.6	nc
Chemical engineers	430	.1	2
Civil engineers	1,840	.4	3
Computer engineers	620	.1	27
Electrical/electronics engineers	12,760	2.9	2
Industrial engineers	1,260	.3	1
Mechanical engineers	1,690	.4	2
Safety engineers	660	.1	6
Nuclear engineers	1,850	.4	1
Other, n.e.c	3,920	.9	nc
Technicians	29,410	6.6	nc
Computer programmers	3,210	.7	1
Drafters	6,690	1.5	nc
Surveyors	1,600	.3	nc
Electrical/electronics engineering technicians	7,630	1.7	5
Mechanical engineering technicians	890	.2	3
Civil engineering technicians	460	.1	14
All other engineering technicians	6,490	1.5	nc
Physical and life science technicians	2,440	.6	1
Managers of scientific and technical personnel	4,090	.9	2
Gas production and distribution (SIC 4920):			
Scientific and technical personnel	13,830	8.3	nc
Scientists	2,750	1.6	nc
All other mathematicians	180	.1	0
Geologists, geophysicists, and earth scientists	370	.2	27
All other physical scientists	40	<	nc
Life scientists	60	<	11
Social scientists	70	<	0
Computer analysts	2,030	1.2	<
Engineers	3,170	1.9	nc
Chemical engineers	110	.1	0
Civil engineers	860	.5	1
Computer engineers	50	<	5

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

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Industry and occupation	Total	Percentage of total industry employment	Relative error
Gas production and distribution (SIC 4920)--continued:			
Electrical/electronics engineers	290	0.2	4
Industrial engineers	230	.1	2
Mechanical engineers	480	.3	2
Safety engineers	150	.1	6
Other, n.e.c	1,000	.6	nc
Technicians	6,530	3.9	nc
Computer programmers	1,240	.8	1
Drafters	1,230	.7	nc
Surveyors	490	.3	nc
Electrical/electronics engineering technicians	530	.3	8
Mechanical engineering technicians	330	.2	8
Civil engineering technicians	450	.3	3
All other engineering technicians	2,160	1.3	nc
Physical and life science technicians	100	.1	9
Managers of scientific and technical personnel	1,380	.8	3
Combination utility services (SIC 4930):			
Scientific and technical personnel	27,330	14.0	nc
Scientists	3,550	1.8	nc
All other mathematicians	150	.1	0
Geologists, geophysicists, and earth scientists	30	<	0
All other physical scientists	300	.1	nc
Life scientists	150	.1	0
Social scientists	100	.1	0
Computer analysts	2,820	1.4	<
Engineers	12,010	6.1	nc
Chemical engineers	250	.1	1
Civil engineers	700	.4	1
Computer engineers	290	.1	2
Electrical/electronics engineers	3,870	2.0	<
Industrial engineers	630	.3	<
Mechanical engineers	1,550	.8	<
Safety engineers	250	.1	<
Nuclear engineers	1,240	.6	0
Other, n.e.c	3,230	1.7	nc
Technicians	10,800	5.5	nc
Computer programmers	1,010	.5	<
Drafters	2,130	1.1	nc
Surveyors	1,130	.6	nc
Electrical/electronics engineering technicians	2,200	1.1	<

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

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Industry and occupation	Total	Percentage of total industry employment	Relative error
Combination utility services (SIC 4930)--continued:			
Mechanical engineering technicians	910	0.5	1
Civil engineering technicians	280	.1	1
All other engineering technicians	2,620	1.4	nc
Physical and life science technicians	520	.3	2
Managers of scientific and technical personnel	970	.5	1
Water supply (SIC 4940):			
Scientific and technical personnel	1,300	4.9	nc
Scientists	160	.6	nc
All other physical scientists	100	.4	nc
Life scientists	20	.1	9
Computer analysts	40	.1	6
Engineers	400	1.5	nc
Civil engineers	340	1.3	1
Electrical/electronics engineers	20	.1	2
Industrial engineers	10	<	0
Mechanical engineers	20	.1	0
Other, n.e.c.	10	<	nc
Technicians	540	2.0	nc
Computer programmers	60	.2	0
Drafters	190	.7	nc
Surveyors	40	.1	nc
Civil engineering technicians	60	.2	0
All other engineering technicians	140	.5	nc
Physical and life science technicians	50	.2	4
Managers of scientific and technical personnel	200	.8	2
Sanitary services (SIC 4950):			
Scientific and technical personnel	5,150	4.2	nc
Scientists	1,220	1.0	nc
Geologists, geophysicists, and earth scientists	450	.4	7
All other physical scientists	500	.4	nc
Life scientists	90	.1	11
Computer analysts	180	.1	nc
Engineers	1,080	.8	nc
Chemical engineers	330	.3	8
Civil engineers	260	.2	4
Computer engineers	10	.0	12
Electrical/electronics engineers	20	<	0

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

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Industry and occupation	Total	Percentage of total industry employment	Relative error
Sanitary services (SIC 4950)--continued:			
Industrial engineers	30	<	0
Mechanical engineers	70	0.1	2
Safety engineers	180	.1	23
Other, n.e.c	180	.1	nc
Technicians	1,610	1.3	nc
Computer programmers	180	.1	<
Drafters	180	.1	nc
Surveyors	20	<	0
Electrical/electronics engineering technicians	30	<	0
Mechanical engineering technicians	60	<	0
Civil engineering technicians	80	.1	4
All other engineering technicians	580	.5	nc
Physical and life science technicians	480	.4	13
Managers of scientific and technical personnel	1,240	1.0	10
Steam and air-conditioning supply (SIC 4960):			
Scientific and technical personnel	140	6.5	nc
Scientists	30	1.3	nc
Geologists, geophysicists, and earth scientists	20	.7	0
Computer analysts	10	.3	nc
Engineers	50	2.7	nc
Electrical/electronics engineers	20	1.0	0
Mechanical engineers	20	.8	4
Other, n.e.c	10	.3	nc
Technicians	20	.9	nc
All other engineering technicians	10	.3	nc
Physical and life science technicians	10	.3	0
Managers of scientific and technical personnel	40	1.7	2
Irrigation systems (SIC 4970):			
Scientific and technical personnel	40	1.8	nc
Engineers	10	.5	nc
Civil engineers	10	.5	57
Technicians	20	.8	nc
All other engineering technicians	20	.7	nc
Managers of scientific and technical personnel	10	.3	18

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

Industry and occupation	Total	Percentage of total industry employment	Relative error
Motor vehicles, parts, and supplies (SIC 5010):			
Scientific and technical personnel	3,720	0.8	nc
Scientists	400	.1	nc
Computer analysts	400	.1	4
Engineers	1,060	.2	nc
Electrical/electronics engineers	120	<	21
Mechanical engineers	260	.1	13
Sales engineers	220	<	13
Other, n.e.c	460	.1	nc
Technicians	1,890	.4	nc
Computer programmers	1,040	.2	6
Drafters	70	<	14
Electrical/electronics engineering technicians	520	.1	26
Mechanical engineering technicians	80	<	15
All other engineering technicians	180	<	nc
Managers of scientific and technical personnel	370	.1	7
Furniture and home furnishings (SIC 5020):			
Scientific and technical personnel	1,330	.9	nc
Scientists	150	.1	nc
Computer analysts	150	.1	10
Engineers	220	.1	nc
Mechanical engineers	10	.0	19
Sales engineers	20	<	11
Other, n.e.c	190	.1	nc
Technicians	880	.6	nc
Computer programmers	490	.3	9
Drafters	200	.1	15
Electrical/electronics engineering technicians	80	.1	48
All other engineering technicians	110	.1	nc
Managers of scientific and technical personnel	80	.1	9
Lumber and construction materials (SIC 5030):			
Scientific and technical personnel	1,770	.7	nc
Scientists	190	.1	nc
Physical scientists	30	<	28
Computer analysts	160	.1	4

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

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Industry and occupation	Total	Percentage of total industry employment	Relative error
Lumber and construction materials (SIC 5030)--continued:			
Engineers	280	0.1	nc
Mechanical engineers	60	<	5
Sales engineers	70	<	2
Other, n.e.c	150	.1	nc
Technicians	1,150	.5	nc
Computer programmers	370	.2	8
Drafters	420	.2	5
Electrical/electronics engineering technicians	60	<	13
Mechanical engineering technicians	70	<	36
All other engineering technicians	170	.1	nc
Physical and life science technicians	60	<	5
Managers of scientific and technical personnel	150	.1	2
Professional and commercial equipment (SIC 5040):			
Scientific and technical personnel	106,430	13.5	nc
Scientists	10,360	1.3	nc
Physical scientists	240	<	46
Life scientists	390	<	39
Computer analysts	9,730	1.2	5
Engineers	35,810	4.5	nc
Electrical/electronics engineers	25,100	3.2	1
Mechanical engineers	1,000	.1	11
Sales engineers	3,980	.5	11
Other, n.e.c	5,730	.7	nc
Technicians	53,730	6.8	nc
Computer programmers	19,750	2.5	5
Drafters	680	.1	8
Electrical/electronics engineering technicians	28,450	3.6	8
Mechanical engineering technicians	1,100	.1	16
All other engineering technicians	3,380	.4	nc
Physical and life science technicians	370	<	15
Managers of scientific and technical personnel	6,530	.8	2
Metals and minerals, except petroleum (SIC 5050):			
Scientific and technical personnel	1,780	1.3	nc
Scientists	210	.1	nc
Physical scientists	20	<	14
Computer analysts	190	.1	5

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

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Industry and occupation	Total	Percentage of total industry employment	Relative error
Metals and minerals, except petroleum (SIC 5050)--continued:			
Engineers	350	0.2	nc
Electrical/electronics engineers	40	<	22
Mechanical engineers	100	.1	11
Sales engineers	100	.1	21
Other, n.e.c	110	.1	nc
Technicians	1,100	.8	nc
Computer programmers	410	.3	4
Drafters	440	.3	17
Electrical/electronics engineering technicians	60	<	13
Mechanical engineering technicians	10	<	22
All other engineering technicians	130	.1	nc
Physical and life science technicians	50	<	21
Managers of scientific and technical personnel	120	0.1	5
Electrical goods (SIC 5060):			
Scientific and technical personnel	48,400	10.2	nc
Scientists	2,110	.4	nc
Physical scientists	100	<	93
Life scientists	10	.0	72
Computer analysts	2,000	.4	10
Engineers	15,330	3.2	nc
Electrical/electronics engineers	7,310	1.5	6
Mechanical engineers	1,460	.3	22
Sales engineers	4,200	.9	8
Other, n.e.c	2,360	.5	nc
Technicians	28,890	6.1	nc
Computer programmers	4,300	.9	2
Drafters	490	.1	16
Electrical/electronics engineering technicians	22,390	4.7	4
Mechanical engineering technicians	240	.1	16
All other engineering technicians	1,440	.3	nc
Physical and life science technicians	30	.0	9
Managers of scientific and technical personnel	2,070	.4	5

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

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Industry and occupation	Total	Percentage of total industry employment	Relative error
Hardware, plumbing, and heating equipment (SIC 5070):			
Scientific and technical personnel	5,840	2.1	nc
Scientists	280	0.1	nc
Physical scientists	20	.0	22
Computer analysts	260	.1	4
Engineers	2,360	.8	nc
Electrical/electronics engineers	210	.1	19
Mechanical engineers	640	.2	8
Sales engineers	1,260	.5	16
Other, n.e.c	250	.1	nc
Technicians	2,930	1.0	nc
Computer programmers	980	.3	11
Drafters	410	.1	13
Electrical/electronics engineering technicians	1,170	.4	13
Mechanical engineering technicians	250	.1	26
All other engineering technicians	110	<	nc
Physical and life science technicians	10	.0	0
Managers of scientific and technical personnel	270	.1	4
Machinery, equipment, and supplies (SIC 5080):			
Scientific and technical personnel	25,050	3.1	nc
Scientists	1,030	.1	nc
Physical scientists	40	.0	13
Life scientists	10	.0	82
Computer analysts	980	.1	8
Engineers	9,720	1.2	nc
Electrical/electronics engineers	1,570	.2	18
Mechanical engineers	2,400	.3	16
Sales engineers	4,630	.6	17
Other, n.e.c	1,120	.1	nc
Technicians	13,000	1.6	nc
Computer programmers	2,870	.4	11
Drafters	1,300	.2	6
Electrical/electronics engineering technicians	7,320	.9	11
Mechanical engineering technicians	910	.1	19
All other engineering technicians	590	.1	nc
Physical and life science technicians	10	.0	0
Managers of scientific and technical personnel	1,300	.2	4

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

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Industry and occupation	Total	Percentage of total industry employment	Relative error
Miscellaneous durable goods (SIC 5090):			
Scientific and technical personnel	3,050	1.0	nc
Scientists	340	0.1	nc
Physical scientists	30	<	21
Life scientists	50	<	46
Computer analysts	260	.1	6
Engineers	390	.1	nc
Electrical/electronics engineers	40	<	2
Mechanical engineers	140	<	25
Sales engineers	110	<	26
Other, n.e.c	100	<	nc
Technicians	2,170	.7	nc
Computer programmers	1,060	.4	5
Drafters	70	<	4
Electrical/electronics engineering technicians	790	.3	14
Mechanical engineering technicians	40	<	9
All other engineering technicians	140	<	nc
Physical and life science technicians	70	<	10
Managers of scientific and technical personnel	150	.1	4
Paper and paper products (SIC 5110):			
Scientific and technical personnel	1,850	.7	nc
Scientists	360	.1	nc
Computer analysts	360	.1	5
Engineers	250	.1	nc
Mechanical engineers	50	<	9
Sales engineers	130	.1	14
Other, n.e.c	70	<	nc
Technicians	1,110	.4	nc
Computer programmers	740	.3	10
Drafters	20	<	2
Electrical/electronics engineering technicians	240	.1	15
All other engineering technicians	100	<	nc
Physical and life science technicians	10	.0	15
Managers of scientific and technical personnel	130	.1	8

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

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Industry and occupation	Total	Percentage of total industry employment	Relative error
Drugs, proprietaries, and sundries (SIC 5120):			
Scientific and technical personnel	3,630	1.9	nc
Scientists	1,030	0.5	nc
Physical scientists	250	.1	15
Life scientists	300	.2	35
Computer analysts	480	.2	5
Engineers	370	.2	nc
Electrical/electronics engineers	20	<	0
Mechanical engineers	50	<	0
Sales engineers	200	.1	20
Other, n.e.c	100	.1	nc
Technicians	1,910	1.0	nc
Computer programmers	1,100	.6	5
Drafters	40	<	49
Electrical/electronics engineering technicians	210	.1	35
Mechanical engineering technicians	30	<	0
All other engineering technicians	30	<	nc
Physical and life science technicians	500	.3	22
Managers of scientific and technical personnel	320	.2	6
Apparel, piece goods, and notions (SIC 5130):			
Scientific and technical personnel	1,700	.8	nc
Scientists	350	.2	nc
Life scientists	20	.0	0
Computer analysts	330	.2	9
Engineers	190	.1	nc
Mechanical engineers	20	<	38
Sales engineers	30	<	0
Other, n.e.c	140	.1	nc
Technicians	1,040	.5	nc
Computer programmers	910	.5	12
Drafters	60	<	32
All other engineering technicians	70	<	nc
Managers of scientific and technical personnel	120	.1	24
Groceries and related products (SIC 5140):			
Scientific and technical personnel	6,090	.7	nc
Scientists	1,410	.1	nc
Physical scientists	150	<	35

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

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Industry and occupation	Total	Percentage of total industry employment	Relative error
Groceries and related products (SIC 5140)--continued:			
Life scientists	190	<	76
Computer analysts	1,070	0.1	3
Engineers	470	<	nc
Electrical/electronics engineers	120	<	13
Mechanical engineers	200	<	8
Sales engineers	40	.0	6
Other, n.e.c	110	<	nc
Technicians	3,630	.4	nc
Computer programmers	2,420	.3	6
Drafters	260	<	27
Electrical/electronics engineering technicians	200	<	9
Mechanical engineering technicians	50	.0	18
All other engineering technicians	230	<	nc
Physical and life science technicians	470	.1	23
Managers of scientific and technical personnel	580	.1	8
Farm-product raw materials (SIC 5150):			
Scientific and technical personnel	520	.4	nc
Scientists	90	.1	nc
Physical scientists	30	<	22
Life scientists	20	<	31
Computer analysts	40	<	6
Engineers	50	<	nc
Electrical/electronics engineers	10	.0	8
Sales engineers	20	<	10
Other, n.e.c	20	<	nc
Technicians	350	.3	nc
Computer programmers	260	.2	11
Electrical/electronics engineering technicians	50	<	49
All other engineering technicians	10	<	nc
Physical and life science technicians	30	<	39
Managers of scientific and technical personnel	30	<	1
Chemicals and allied products (SIC 5160):			
Scientific and technical personnel	6,070	4.3	nc
Scientists	1,560	1.1	nc
Physical scientists	1,100	.8	3

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

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Industry and occupation	Total	Percentage of total industry employment	Relative error
Chemicals and allied products (SIC 5160)--continued:			
Life scientists	140	0.1	6
Computer analysts	320	.2	1
Engineers	1,620	1.1	nc
Electrical/electronics engineers	90	.1	22
Mechanical engineers	160	.1	5
Sales engineers	870	.6	6
Other, n.e.c	500	.3	nc
Technicians	2,500	1.8	nc
Computer programmers	450	.3	10
Drafters	80	.1	3
Electrical/electronics engineering technicians	490	.3	26
Mechanical engineering technicians	60	<	12
All other engineering technicians	440	.3	nc
Physical and life science technicians	980	.7	8
Managers of scientific and technical personnel	390	.3	9
Petroleum and petroleum products (SIC 5170):			
Scientific and technical personnel	3,210	1.7	nc
Scientists	650	.3	nc
Physical scientists	240	.1	6
Computer analysts	410	.2	2
Engineers	980	.5	nc
Electrical/electronics engineers	30	<	23
Mechanical engineers	140	.1	3
Sales engineers	80	<	7
Other, n.e.c	730	.4	nc
Technicians	1,370	.7	nc
Computer programmers	420	.2	5
Drafters	60	<	6
Electrical/electronics engineering technicians	110	.1	8
Mechanical engineering technicians	210	.1	29
All other engineering technicians	230	.1	nc
Physical and life science technicians	340	.2	3
Managers of scientific and technical personnel	210	.1	1
Beer, wine, and distilled beverages (SIC 5180):			
Scientific and technical personnel	580	.3	nc

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

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Industry and occupation	Total	Percentage of total industry employment	Relative error
Beer, wine, and distilled beverages (SIC 5180)--continued:			
Scientists	110	0.1	nc
Computer analysts	110	.1	3
Engineers	40	<	nc
Mechanical engineers	30	<	2
Other, n.e.c	10	0.0	nc
Technicians	400	.2	nc
Computer programmers	360	.2	8
Drafters	10	.0	4
Physical and life science technicians	30	<	21
Managers of scientific and technical personnel	30	<	5
Miscellaneous nondurable goods (SIC 5190):			
Scientific and technical personnel	5,720	1.1	nc
Scientists	1,620	.3	nc
Physical scientists	200	<	19
Life scientists	530	.1	6
Computer analysts	890	.2	2
Engineers	350	.1	nc
Electrical/electronics engineers	20	.0	7
Mechanical engineers	120	<	13
Sales engineers	110	<	10
Other, n.e.c	100	<	nc
Technicians	3,320	.6	nc
Computer programmers	1,650	.3	5
Drafters	40	.0	14
Electrical/electronics engineering technicians	170	<	41
Mechanical engineering technicians	10	.0	0
All other engineering technicians	190	<	nc
Physical and life science technicians	1,260	.2	10
Managers of scientific and technical personnel	430	.1	6
Lumber and other building materials (SIC 5210):			
Scientific and technical personnel	1,920	.4	nc
Scientists	270	.1	nc
Life scientists	20	.0	0
Computer analysts	250	.1	2

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

Industry and occupation	Total	Percentage of total industry employment	Relative error
Lumber and other building materials (SIC 5210)--continued:			
Engineers	190	<	nc
Mechanical engineers	10	0.0	0
Sales engineers	130	<	20
Other, n.e.c	50	<	nc
Technicians	1,360	.3	nc
Computer programmers	360	.1	5
Drafters	920	.2	14
All other engineering technicians	80	<	nc
Managers of scientific and technical personnel	100	<	8
Paint, glass, and wallpaper stores (SIC 5230):			
Scientific and technical personnel	120	.1	nc
Scientists	40	<	nc
Physical scientists	20	<	31
Computer analysts	20	<	7
Engineers	10	.0	nc
Other, n.e.c	10	.0	nc
Technicians	70	.1	nc
Computer programmers	20	<	0
Drafters	40	.1	23
All other engineering technicians	10	<	nc
Hardware stores (SIC 5250):			
Scientific and technical personnel	230	.1	nc
Scientists	150	.1	nc
Computer analysts	150	.1	nc
Engineers	40	<	nc
Sales engineers	30	<	0
Other, n.e.c	10	.0	nc
Technicians	40	<	nc
Drafters	10	.0	30
All other engineering technicians	30	<	nc
Retail nurseries and garden stores (SIC 5260):			
Scientific and technical personnel	190	.2	nc
Scientists	20	.0	nc
Life scientists	10	.0	0
Computer analysts	10	.0	8

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

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Industry and occupation	Total	Percentage of total industry employment	Relative error
Retail nurseries and garden stores (SIC 5260)--continued:			
Engineers	20	<	nc
Mechanical engineers	10	<	0
Other, n.e.c	10	0.0	nc
Technicians	150	.1	nc
Computer programmers	10	<	9
Drafters	120	.1	7
All other engineering technicians	10	.0	nc
Physical and life science technicians	10	<	0
Department stores (SIC 5310):			
Scientific and technical personnel	7,290	.3	nc
Scientists	2,790	.1	nc
Computer analysts	2,790	.1	3
Engineers	1,640	.1	nc
Electrical/electronics engineers	340	<	1
Mechanical engineers	120	.0	14
Sales engineers	500	<	1
Other, n.e.c	680	<	nc
Technicians	1,900	.1	nc
Computer programmers	1,180	.1	4
Drafters	170	.0	4
Electrical/electronics engineering technicians	370	<	3
Mechanical engineering technicians	90	.0	15
All other engineering technicians	90	.0	nc
Managers of scientific and technical personnel	960	<	2
Variety stores (SIC 5330):			
Scientific and technical personnel	180	.1	nc
Scientists	30	<	0
Computer analysts	30	<	0
Technicians	130	.1	nc
Computer programmers	120	.1	6
All other engineering technicians	10	.0	nc
Managers of scientific and technical personnel	20	<	0
Miscellaneous general merchandise stores (SIC 5390):			
Scientific and technical personnel	380	.1	nc

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

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Industry and occupation	Total	Percentage of total industry employment	Relative error
Miscellaneous general merchandise stores (SIC 5390)--continued:			
Scientists	100	<	4
Computer analysts	100	<	4
Engineers	20	0.0	nc
Mechanical engineers	10	.0	0
Other, n.e.c	10	.0	nc
Technicians	230	.1	nc
Computer programmers	210	.1	2
All other engineering technicians	20	.0	nc
Managers of scientific and technical personnel	30	<	45
Grocery stores (SIC 5410):			
Scientific and technical personnel	1,990	<	nc
Scientists	800	<	nc
Computer analysts	800	<	0
Engineers	140	.0	nc
Electrical/electronics engineers	10	.0	0
Mechanical engineers	40	.0	0
Other, n.e.c	90	.0	nc
Technicians	830	<	nc
Computer programmers	660	<	3
Drafters	60	.0	0
All other engineering technicians	90	.0	nc
Physical and life science technicians	20	.0	0
Managers of scientific and technical personnel	220	.0	0
Meat and fish markets (SIC 5420):			
Scientific and technical personnel	10	<	nc
Scientists	10	<	nc
Computer analysts	10	<	nc
Fruit and vegetable markets (SIC 5430):			
Scientific and technical personnel	10	<	nc
Scientists	10	<	nc
Computer analysts	10	<	nc

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

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Industry and occupation	Total	Percentage of total industry employment	Relative error
Retail bakeries (SIC 5460):			
Scientific and technical personnel	10	0.0	nc
Scientists	10	.0	nc
Computer analysts	10	.0	nc
Miscellaneous food stores (SIC 5490):			
Scientific and technical personnel	20	<	nc
Scientists	20	<	nc
Computer analysts	20	<	nc
New and used car dealers (SIC 5510):			
Scientific and technical personnel	60	.0	nc
Scientists	20	.0	26
Computer analysts	20	.0	26
Engineers	10	.0	nc
Other, n.e.c	10	.0	nc
Technicians	30	.0	nc
Computer programmers	30	.0	44
Auto and home supply stores (SIC 5530):			
Scientific and technical personnel	200	<	nc
Scientists	40	<	13
Computer analysts	40	<	13
Engineers	80	<	57
Sales engineers	80	<	57
Technicians	70	<	nc
Computer programmers	30	.0	3
All other engineering technicians	40	<	nc
Managers of scientific and technical personnel	10	.0	31
Gasoline service stations (SIC 5540):			
Scientific and technical personnel	330	<	nc
Scientists	50	.0	nc
Physical scientists	30	.0	28
Computer analysts	20	.0	nc
Engineers	50	.0	nc
Mechanical engineers	10	.0	29
Other, n.e.c	40	.0	nc

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

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Industry and occupation	Total	Percentage of total industry employment	Relative error
Gasoline service stations (SIC 5540)--continued:			
Technicians	220	<	nc
Computer programmers	120	<	10
All other engineering technicians	100	<	nc
Managers of scientific and technical personnel	10	0.0	22
Boat dealers (SIC 5550):			
Scientific and technical personnel	20	.1	nc
Scientists	10	<	nc
Computer analysts	10	<	nc
Technicians	10	<	nc
All other engineering technicians	10	<	nc
Automotive dealers, n.e.c. (SIC 5590):			
Scientific and technical personnel	60	.7	nc
Scientists	10	.1	nc
Computer analysts	10	.1	nc
Engineers	20	.3	nc
Other, n.e.c	20	.3	nc
Technicians	30	.4	nc
All other engineering technicians	30	.4	nc
Men's and boys' clothing stores (SIC 5610):			
Scientific and technical personnel	80	.1	nc
Scientists	40	<	9
Computer analysts	40	<	9
Technicians	30	<	nc
Computer programmers	30	<	5
Managers of scientific and technical personnel	10	.0	0
Women's clothing stores (SIC 5620):			
Scientific and technical personnel	280	.1	nc
Scientists	110	<	7
Computer analysts	110	<	7
Technicians	140	<	nc
Computer programmers	130	<	6
Drafters	10	.0	0

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

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Industry and occupation	Total	Percentage of total industry employment	Relative error
Women's clothing stores (SIC 5620)--continued:			
Managers of scientific and technical personnel	30	0.0	5
Women's accessory and specialty stores (SIC 5630):			
Scientific and technical personnel	50	.1	nc
Scientists	20	<	0
Computer analysts	20	<	0
Technicians	30	.1	nc
Computer programmers	30	.1	0
Children's and infants' wear stores (SIC 5640):			
Scientific and technical personnel	60	.2	nc
Scientists	40	.1	nc
Computer analysts	40	.1	nc
Technicians	20	.1	54
Computer programmers	20	.1	54
Family clothing stores (SIC 5650):			
Scientific and technical personnel	670	.2	nc
Scientists	240	.1	nc
Computer analysts	240	.1	nc
Engineers	30	.0	nc
Mechanical engineers	20	.0	19
Other, n.e.c	10	.0	nc
Technicians	320	.1	nc
Computer programmers	290	.1	16
Drafters	20	.0	0
All other engineering technicians	10	.0	nc
Managers of scientific and technical personnel	80	<	0
Shoe stores (SIC 5660):			
Scientific and technical personnel	360	.1	nc
Scientists	100	<	3
Computer analysts	100	<	3
Technicians	250	.1	nc
Computer programmers	160	.1	12
All other engineering technicians	90	<	nc

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

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Industry and occupation	Total	Percentage of total industry employment	Relative error
Shoe stores (SIC 5660)--continued:			
Managers of scientific and technical personnel	10	0.0	15
Miscellaneous apparel and accessory stores (SIC 5690):			
Scientific and technical personnel	90	.1	nc
Scientists	20	<	24
Computer analysts	20	<	24
Engineers	10	.0	nc
Other, n.e.c	10	.0	nc
Technicians	60	.1	nc
Computer programmers	40	<	0
All other engineering technicians	20	<	nc
Furniture and home furnishings stores (SIC 5710):			
Scientific and technical personnel	760	.1	nc
Scientists	120	<	7
Computer analysts	120	<	7
Engineers	10	.0	nc
Mechanical engineers	10	.0	0
Technicians	610	.1	nc
Computer programmers	370	.1	14
Drafters	230	.1	16
All other engineering technicians	10	.0	nc
Managers of scientific and technical personnel	20	.0	7
Household appliance stores (SIC 5720):			
Scientific and technical personnel	350	.4	nc
Scientists	220	.3	nc
Computer analysts	220	.3	nc
Engineers	40	<	nc
Other, n.e.c	40	<	nc
Technicians	50	.1	nc
All other engineering technicians	50	.1	nc
Managers of scientific and technical personnel	40	<	16

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

Industry and occupation	Total	Percentage of total industry employment	Relative error
Radio, television, and computer stores (SIC 5730):			
Scientific and technical personnel	7,130	2.5	nc
Scientists	1,380	0.5	8
Computer analysts	1,380	.5	8
Engineers	1,750	.6	nc
Electrical/electronics engineers	960	.3	16
Mechanical engineers	30	<	46
Sales engineers	500	.2	7
Other, n.e.c	260	.1	nc
Technicians	3,520	1.3	nc
Computer programmers	2,720	1.0	14
Drafters	60	<	34
Electrical/electronics engineering technicians	430	.1	9
All other engineering technicians	310	.1	nc
Managers of scientific and technical personnel	480	.2	15
Eating and drinking places (SIC 5810):			
Scientific and technical personnel	1,840	<	nc
Scientists	390	.0	nc
Computer analysts	390	.0	nc
Engineers	380	.0	nc
Sales engineers	330	.0	56
Other, n.e.c	50	.0	nc
Technicians	760	<	nc
Computer programmers	720	<	52
Drafters	20	.0	64
Physical and life science technicians	20	.0	80
Managers of scientific and technical personnel	310	.0	90
Drug stores and proprietary stores (SIC 5910):			
Scientific and technical personnel	760	.1	nc
Scientists	260	<	1
Computer analysts	260	<	1
Engineers	30	.0	nc
Mechanical engineers	10	.0	14
Other, n.e.c	20	.0	nc

See explanatory information and SOURCE at end of table.

Table 5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

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Industry and occupation	Total	Percentage of total industry employment	Relative error
Drug stores and proprietary stores (SIC 5910)--continued:			
Technicians	380	0.1	nc
Computer programmers	320	.1	9
Drafters	40	.0	0
All other engineering technicians	20	.0	nc
Managers of scientific and technical personnel	90	<	3
Liquor stores (SIC 5920):			
Scientific and technical personnel	40	<	nc
Scientists	20	<	nc
Computer analysts	20	<	nc
Technicians	20	<	8
Computer programmers	20	<	8
Used merchandise stores (SIC 5930):			
Scientific and technical personnel	60	.1	nc
Scientists	10	.0	nc
Computer analysts	10	.0	nc
Engineers	30	<	nc
Other, n.e.c.	30	<	nc
Technicians	20	<	nc
Computer programmers	10	<	19
All other engineering technicians	10	<	nc
Miscellaneous shopping goods stores (SIC 5940):			
Scientific and technical personnel	1,280	.1	nc
Scientists	240	<	10
Computer analysts	240	<	10
Engineers	220	<	nc
Sales engineers	180	<	49
Other, n.e.c.	40	.0	nc
Technicians	690	.1	nc
Computer programmers	550	.1	6
Drafters	50	.0	58
Electrical/electronics engineering technicians	50	.0	41
All other engineering technicians	40	.0	nc
Managers of scientific and technical personnel	130	<	47

See explanatory information and SOURCE at end of table.

Table A-5. Scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries as a percentage of total industry employment, and relative error: 1991

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Industry and occupation	Total	Percentage of total industry employment	Relative error
Fuel dealers (SIC 5980):			
Scientific and technical personnel	200	0.2	nc
Scientists	40	<	nc
Computer analysts	40	<	13
Engineers	60	.1	nc
Sales engineers	50	.1	48
Other, n.e.c	10	.0	nc
Technicians	90	.1	nc
Computer programmers	60	.1	2
All other engineering technicians	20	<	nc
Physical and life science technicians	10	.0	27
Managers of scientific and technical personnel	10	<	7
Retail stores, n.e.c. (SIC 5990):			
Scientific and technical personnel	1,290	.3	nc
Scientists	80	<	8
Computer analysts	80	<	8
Engineers	500	.1	nc
Electrical/electronics engineers	430	.1	<
Sales engineers	20	.0	20
Other, n.e.c	50	<	nc
Technicians	670	.1	nc
Computer programmers	110	<	11
Drafters	80	<	30
Electrical/electronics engineering technicians	390	.1	28
All other engineering technicians	70	<	nc
Physical and life science technicians	20	.0	0
Managers of scientific and technical personnel	40	<	37

NOTE: Because of rounding, components may not add to totals.

KEY:
nc = not computed
< = The estimated actual value is less than 50 for numbers and less than 0.05 for percents.
0 = Data were collected and the reported number or value was zero.
n.e.c. = not elsewhere classified

SOURCE: National Science Foundation/SRS, using data from U.S. Department of Labor/Bureau of Labor Statistics, Occupational Employment Statistics Survey

Table 6. R&D scientific, engineering, and technical (SET) personnel and SET personnel managers in trade and regulated industries, by detailed industry of employment: 1991

[Filled jobs in thousands]

Page 1 of 1

Detailed industry	Total SET personnel		Scientists		Engineers		Technicians		SET personnel managers	
	Number	Pct	Number	Pct	Number	Pct	Number	Pct	Number	Pct
Total trade and regulated	1.4	100.0	0.2	100.0	0.8	100.0	0.2	100.0	0.1	100.0
Transportation and public utilities	1.4	100.0	.2	100.0	.8	100.0	.2	100.0	.1	100.0
Communications	0.7	53.3	.1	59.1	.4	46.2	.2	72.7	.1	53.3
Telephone communications	.1	4.4	.0	0.0	<	1.3	<	4.5	<	26.7
Telegraph and other communications	<	2.9	<	9.1	<	2.6	.0	0.0	.0	0.0
Radio and television broadcasting	.1	3.6	.0	.0	<	1.3	<	13.6	<	6.7
Cable and other pay TV services	.1	10.2	<	9.1	<	3.8	.1	40.9	.0	.0
Communications services, n.e.c.	.4	32.1	.1	40.9	.3	37.2	<	13.6	<	20.0
Electric, gas, and sanitary services	.6	46.7	.1	40.9	.4	53.8	.1	27.3	.1	46.7
Electric services	.2	15.3	.1	27.3	.1	12.8	<	9.1	<	20.0
Gas production and distribution	<	1.5	.0	.0	<	1.3	<	4.5	.0	.0
Combination utility services	.3	22.6	<	9.1	.3	33.3	<	13.6	.0	.0
Sanitary services	.1	7.3	<	4.5	.1	6.4	.0	.0	<	26.7

NOTE: Because of rounding, components may not add to totals.

KEY: < = The estimated actual value is less than 50.
0 = Data were collected and the reported number or value was zero.
n.e.c. = not elsewhere classified

SOURCE: National Science Foundation/SRS, using data from U.S. Department of Labor/Bureau of Labor Statistics, Occupational Employment Statistics Survey

Table 7. R&D scientists in trade and regulated industries, by broad industry group of employment and detailed occupation: 1991

[Filled jobs in thousands]

Page 1 of 1

Broad industry group of employment	Total	Physical	Life	Social	Computer
Total trade and regulated........	0.2	<	<	<	0.2
Transportation and public utilities.....	.2	<	<	<	.2
Communications.......................	.1	0.0	0.0	0.0	.1
Electric, gas, and sanitary services..	.1	<	<	<	<

NOTE: Because of rounding, components may not add to totals.

KEY: < = The estimated actual value is less than 50.
0 = Data were collected and the reported number or value was zero.

SOURCE: National Science Foundation/SRS, using data from U.S. Department of Labor/Bureau of Labor Statistics, Occupational Employment Statistics Survey

Table 8. R&D engineers in trade and regulated industries, by broad industry group of employment and detailed occupation: 1991

[Filled jobs in thousands]

Page 1 of 1

Broad industry group of employment	Total	Civil	Electrical/ elec- tronics	Computer	Indus- trial	Other
Total trade and regulated..........	0.8	<	0.1	0.1	<	0.5
Transportation and public utilities.....	.8	<	.1	.1	<	.5
Communications........................	.3	0.0	.1	.1	0.0	.2
Electric, gas, and sanitary services..	.4	<	.1	.0	<	.3

NOTE: Because of rounding, components may not add to totals.

KEY: < = The estimated actual value is less than 50.
0 = Data were collected and the reported number or value was zero.

SOURCE: National Science Foundation/SRS, using data from U.S. Department of Labor/Bureau of Labor Statistics, Occupational Employment Statistics Survey

Table 9. R&D technicians in trade and regulated industries, by broad industry group of employment and detailed occupation: 1991

[Filled jobs in thousands]

Page 1 of 1

Broad industry group of employment	Total	Science	Engineering		
			Total	Electrical/ electronics	Other
Total trade and regulated...........	0.2	<	0.2	0.1	0.1
Transportation and public utilities.....	.2	<	.2	.1	.1
Communications.........................	.2	0.0	.2	.1	<
Electric, gas, and sanitary services..	.1	<	.1	<	<

NOTE: Because of rounding, components may not add to totals.

KEY: < = The estimated actual value is less than 50.
0 = Data were collected and the reported number or value was zero.

SOURCE: National Science Foundation/SRS, using data from U.S. Department of Labor/Bureau of Labor Statistics, Occupational Employment Statistics Survey

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Appendix: Technical Notes

Scope of the Survey

The Occupational Employment Statistics (OES) Survey[1] is the source of extensive and detailed data on employed scientists, engineers, and technicians (SETs) in U.S. industry. It is conducted in 3-year cycles: Manufacturing industries are surveyed in the first year; mining, construction, and financial and other service industries in the nonmanufacturing sector are surveyed in the second year; and trade, communications, transportation, and public utilities are surveyed in the third year. Data in this report are from the 1991 Trade and Regulated Industries Survey, covering Standard Industrial Classification (SIC) codes 40-42 and 44-59. The reference dates of the survey were the weeks that included April 12, May 12, or June 12, 1991, depending on the SIC code of the sampled unit. The survey covered all 50 States and the District of Columbia.

Method of Collection

Survey forms for the OES Survey are mailed to personnel offices of most sample establishments. In a few cases forms are mailed to the company headquarters. The responses supplied by the companies are separated according to establishment by the Regional Office of the area in which the company headquarters is located. The Regional Office then forwards the data to the State in which the respective establishments are located. Nonrespondents receive two additional mailings at 6-week intervals with telephone followups. Responses from the larger companies are critical to the survey. When they do not respond to the mailed questionnaire, but will provide the data in person, survey field personnel arrange a meeting for this purpose.

Survey questionnaires are tailored for specific industries at the 2-digit SIC level so that data can be aggregated at that level. The survey is conducted at the more detailed 3-digit SIC level. Each industry surveyed receives a separate questionnaire in which the job categories reflect the jobs of all or almost all employees in that industry. On the questionnaires, specific jobs are grouped under broad headings, each with a residual category for jobs not explicitly listed on the survey form. Abbreviated survey forms that combine kindred jobs are sent to small establishments to diminish the reporting burden and to encourage participation.

Impacts of Data Collection Methodology on Survey Estimates

The data collection methodology used in the OES Survey is such that several problems must be taken into account when using the data. First, the OES Survey may sometimes understate employment in specific fields. If an occupation is very small in an industry, it will not be explicitly listed on that industry's questionnaire. For example, there are few biologists in the Communications industry, and thus the occupational category "biologist" is not on the survey questionnaire; rather, the more aggregated category of "life scientist" is used. Further, if past surveys had found few life scientists in an industry, the life scientists would be put in the even more aggregated category of "all other professionals," for which data would not be included in this report. This survey characteristic can be expected to overstate cross-industry differences in staffing patterns.

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[1] A description of the OES Survey can be found in U.S. Department of Commerce, *The National OES-Based Industry-Occupational Matrix, 1982 and 1985* (Springfield, VA: National Technical Information Service).

Data in this publication on R&D scientists, engineers, and technicians (R&DSETs) are the first such estimates published for trade and regulated industries, and refer to those who spend the "greatest proportion of time . . . on R&D." Scientists, engineers, and technicians who spend less time on R&D are excluded from this R&DSET subset, but are included in the overall SET estimates. Thus, the R&DSET numbers herein are not intended as full-count estimates.

Job and Industry Classification

Data collected in the OES Survey are for approximately 60 SET jobs, and are classified according to the *Dictionary of Occupational Titles* (*DOT*) and the *Standard Occupational Classification System* (*SOC*). The *DOT* system is used to develop single job categories and definitions because its classification scheme is detailed; the broad job categories used in this report are *SOC* categories. These two classification systems combined form the job classification used in this report, as well as for all OES estimates.

Surveyed industries are classified according to the SIC coding system, revised in 1987. Reporting establishments are categorized on the basis of their major product or activity during the previous calendar year.

Comparison With Prior Data for Trade and Regulated Industries

The OES Survey depicts the structure of total employment by industry, including SET personnel. The 1987 revisions to the SIC coding system were used in the OES Survey beginning with 1988. Thus, the SET estimates in this and the prior (1988) report on trade and regulated industries are comparable. But SET estimates for trade and regulated industries for 1982 and 1985 were based on the 1977 SIC system and thus are not comparable with SET estimates thereafter. Also, data for R&D personnel in trade and regulated industries are first available in this report.

Data for all SET personnel are given in table 1 by 2- and 3-digit levels of industry, in tables 2 through 4 by 2-digit level of industry, and in table 5 by 3-digit level of industry. Tables 6 through 9 concern only R&D personnel and otherwise correspond to tables 1 through 4.

Some personnel in electrical and electronics engineering in 1988 have now been classified in the new category of computer engineer or in the computer analyst category. Computer engineers are now a subset of "other" engineers.

Reconciliation With Other SRS Data Series

The National Science Foundation (NSF) supports three survey series covering scientists and engineers in industry: the OES Survey, the Survey of Research and Development in Industry (RDI), and the Scientific and Technical Personnel Data System (STPDS). These surveys cover different aspects of science and engineering (S&E) employment and characteristics. Because the survey definitions, concepts, coverage, and methods of collection vary widely, the resulting estimates differ. Two of the survey questionnaires are completed by employers: the OES Survey, which occurs at the establishment (workplace) level, and the RDI Survey, which occurs at the company headquarters level. The STPDS questionnaires are population-based, i.e., they are completed by the scientists and engineers themselves.

The data from the 1991 OES Survey herein cover total SETs and the R&DSET subset. The OES Survey, conducted by the U.S. Department of Labor's Bureau of Labor Statistics (BLS), is an *establishment-based* survey of nonfarm employers who report the employment of their wage and salary workers by job type. NSF supports this survey to obtain estimates of the numbers in SET jobs. Published data provide job and industry detail.

The RDI is a *company-based* survey of R&D-performing firms conducted by the Census Bureau. Its primary objective is to provide statistics on R&D expenditures in U.S. industry. It also collects data on the overall full-time-equivalent (FTE) number of scientists and engineers who perform R&D in these firms. Unlike the OES and the STPDS Surveys, the RDI Survey excludes social scientists. The data provided cover only total numbers of R&D personnel. Further details are in the report *Research and Development in Industry: 1989* (NSF 92-307).

The STPDS comprises a series of surveys that provides data on employment and other characteristics of personnel who classify themselves as scientists (including social and behavioral scientists) and engineers. The STPDS estimates include some personnel employed in non-S&E jobs. They are categorized by occupational and degree field, sector of employment (e.g., business, government, academia), and primary work activity (e.g., R&D, teaching). Unlike the OES and RDI estimates, the STPDS estimates do not provide industry detail. For further information see the report *U.S. Scientists and Engineers: 1988* (NSF 90-314).

Concepts

An establishment, such as a factory, is the primary sampling unit in the survey. In general, it represents a single physical location and engages in one type of economic activity.

This report covers several types of personnel: full-time and part-time workers; workers on paid vacation or on other types of leave; workers on unpaid short-term absence; salaried officers, executives, and staff of firms; employees temporarily assigned to other units; and employees for whom the unit is a permanent duty station. Excluded from coverage are proprietors (owners and partners of unincorporated firms), unpaid family workers, and workers on extended leave.

The data on scientists and engineers in this report relate to their employment in S&E jobs, rather than to their education or training. Employees are categorized as scientists or engineers if they work at a level of knowledge equivalent to that acquired by completion of a 4-year college course with a science or engineering major, even if a college degree was not obtained. Employees who perform multiple functions are reported in the job requiring the highest level of such knowledge. Supervisors who spend at least 20 percent of their time doing work similar to that of individuals under their supervision are classified in the job category most closely related to their work duties.

Sampling Procedures

The OES Survey is a probability sample with a sampling frame based on lists of establishments covered by State Unemployment Insurance (UI) systems. Because each cooperating State selects its own sample, the reference date of the sampling frame varies according to when the last sample frame was updated and the survey was conducted. The reference date for sampling in the States BLS surveyed was the second quarter of 1990.

The survey universe is stratified by industry and size of establishment unit because these characteristics are believed to be primary determinants of job staffing patterns. Nine size-classes are represented, based on numbers of people employed: 1 to 4, 5 to 9, 10 to 19, 20 to 49, 50 to 99, 100 to 249, 250 to 499, 500 to 999, and 1,000 and more. Because UI reporting units with one to three employees are not sampled in every State, units with four to nine employees receive larger weights to represent employment in the smaller size-classes. Reporting units with 250 or more employees are included in the sample with certainty. Samples for noncertainty size-classes are developed to produce State estimates with target relative errors of 10 percent, 15 percent, or 20 percent at one standard deviation. This is done for SIC groups based on averages of occupational rates and coefficients of variation (CVs) from the previous survey of those groups for a set of typical occupations. This SIC sample-size is allocated to the classes in proportion to their employment. The sample is selected systematically with equal probability within each State/Area[2]/SIC/size-class cell. Establishments with 250 or more employees are certainty units in the sample. States have the option of targeting relative errors of 10 percent, 15 percent, or 20 percent for noncertainty size-classes. Some States vary the target relative error by SIC to decrease the cost by reducing the sample size.

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[2] Some States further stratify their samples by sub-State areas.

Response

Of the reporting units selected, 258,395 were eligible, i.e., those out of business and out of scope were excluded. Usable responses were obtained from 197,269 units. The response rates were 76.3 percent based on units and 74.3 percent based on weighted employment. Subsequent to the close-out date for national estimates, additional data were obtained by the States and used to prepare their respective State estimates. Thus, response rates in most States were higher than the rate used to develop national estimates.

Occupational Estimation

Weights for the sample units for which usable responses are received reflect two factors. Each weight is based on (1) the reciprocal of the probability of selection and (2) the nonresponse adjustment factor. For questionnaires that were not returned or were otherwise unusable, a nonresponse adjustment factor was calculated to impute for the missing data. For each of the 3-digit SIC/State/size-class sampling cells, the nonresponse factor is calculated as follows:

$$\frac{\text{Weighted employment of all eligible units in sample}}{\text{Weighted employment of all responding eligible units}}$$

Sample employment for this ratio is taken from the sampling frame. If the nonresponse adjustment factor in a cell exceeds a predetermined maximum factor, which increases with the number of respondents in the cell, the cell is collapsed with other homogeneous cells within a SIC until the nonresponse adjustment factor for that combined cell is not greater than the appropriate maximum factor. Homogeneous cells are adjacent size cells within a State and SIC. If the collapsing procedure terminates (i.e., no more cells are available for collapse) before satisfying the constraint above, then the most recent maximum factor is used. The weight for each unit is the product of the nonresponse adjustment factor and the reciprocal of the probability of selection.

A separate ratio estimate of occupational employment is used to develop national estimates. The auxiliary variable used is the 1990 population value of total employment. The estimated employment for an occupation at the 3-digit industry *i*/size-class *j* level is

$$\hat{P}_{ij} = \left(\sum_k W_{ijk} P_{ijk}\right)\left(\sum_k \frac{M_{ij}}{W_{ijk} E_{ijk}}\right)$$

where i = a 3-digit industry

j = size-class

k = establishment

$\hat{P}_{ij}$ = estimated employment for occupation P in industry i and size-class j

W_{ijk} = weight for establishment k in industry i and size-class j after adjusting for nonresponse

P_{ijk} = reported employment for occupation P in establishment k within industry i and size-class j

E_{ijk} = reported total employment for establishment k in industry i and size-class j

M_{ij} = population value of total employment for industry i and size-class j

The population value of total employment (M_{ij}) was obtained from the BLS Universe Data Base files for the reference month of the industry.

The estimated employment for an occupation at the 3-digit industry i level is obtained by summing the occupational employment estimates $\hat{P}_{ij}$ across all 3-digit industries j within industry i.

$$\hat{P}_i = \sum_{j=1}^{L_i} \hat{P}_{ij}$$

where L_i is the number of size levels j in industry i.

Similarly, the estimated employment for an occupation at the 2-digit industry g level is obtained by summing the occupational employment estimates P_i across all 3-digit industries i within industry g.

$$\hat{P}_g = \sum_{i=1}^{L_g} \hat{P}_i$$

where L_g is the number of 3-digit industries i in industry g.

Variance Estimation

Estimates of sampling error are calculated on survey estimates to allow users to determine whether or not the occupational estimates are reliable enough for their needs. Only a probability sample can be used to estimate sampling error from the sample itself.

The formulas used to estimate the variance, a common measure of sampling error, are based on both the sample design and the method of estimation. In the OES Survey, the formula used to estimate the variance of occupational employment is a subsample replication technique called the jackknife random group. The jackknife derives estimates of occupational employment from each of R subsamples of the parent sample by leaving out one random group at a time, and then estimates the variance of the occupational employment figure from the variability between the R employment estimates.

The variance for an occupational employment estimate at the 3-digit industry i for size-class j level is

$$S^2(\hat{P}_{ij}) = \frac{1}{(R)\ (R-1)} \sum_{r=1}^{R} (\hat{P}_{ijr} - \hat{P}_{ij})^2$$

where R = number of random groups

$\hat{P}_{ij}$ = estimated employment for occupation P in industry i and size-class j

$S^2(\hat{P}_{ij})$ = estimated variance of $\hat{P}_{ij}$

$\hat{P}_{ijr}$ = estimated pseudo employment for occupation P in industry i, size-class j, and subsample r

$\hat{P}_{ij}$ = estimated mean pseudo employment for occupation P in industry i and size-class j

The variance for an occupational employment estimate at the 3-digit industry i level is obtained by summing the variances $S^2(\hat{P}_{ij})$ across all size-levels j within industry i.

$$S^2(\hat{P}_i) = \sum_{j=1}^{L_i} S^2(\hat{P}_{ij})$$

where L_i is the number of size levels j in industry i.

Similarly, the variance for an occupational employment estimate at the 2-digit industry g level is obtained by summing the variances $S^2(\hat{P}_i)$ across all 3-digit industries within industry g.

$$S^2(\hat{P}_g) = \sum_{i=1}^{L_g} S^2(\hat{P}_i)$$

where L_g is the number of 3-digit industries i in industry g.

Reliability of Estimates

Estimates developed from a sample may differ from the results of a complete census of all the establishments in the sampling frame. Two types of error, sampling and nonsampling, are possible in an estimate based on a sample survey. Sampling error occurs because observations are made only on a sample, not on the entire population. Nonsampling error can be attributed to any of many sources: an inability to obtain information about all cases in the sample; differences in the respondents' interpretation of questions; inability or unwillingness of respondents to provide correct information; errors made in recording, coding, or processing the data; errors made in estimating values for missing data; and failure to represent all units in the population.

The particular sample used in this survey is one of a large number of possible samples of the same size that could have been selected using the same sample design. Estimates derived from the different samples would differ from each other. The deviation of a sample estimate from the average of all possible samples is called the sample error. The standard error of a survey estimate is a measure of the variation among the estimates from all possible samples. Thus, it is a measure of the precision with which an estimate from a particular sample approximates the average results of all possible samples. The relative standard error is the standard error of the estimate divided by the value being estimated. The variance is the standard error squared. In this report, the term "relative error" is synonymous with the term "relative standard error."

The sample estimate and an estimate of its standard error allow construction of interval estimates with prescribed confidence that the interval includes the average result of all possible samples obtainable from the sample design for this survey.

To illustrate, if all possible samples were selected, and each of these was surveyed under essentially the same conditions as the others, and an estimate and its estimated standard error were calculated for each sample, then:

- Approximately 68 percent of the intervals from one standard error below to one standard error above the derived estimate would include the average value of all possible samples.

- Approximately 90 percent of the intervals from 1.6 standard errors below to 1.6 standard errors above the derived estimate would include the average of all possible samples.

- Approximately 95 percent of the intervals from two standard errors below to two standard errors above the derived estimate would include the average of all possible samples.

- Almost all intervals from three standard errors below to three standard errors above the derived estimate would include the average of all possible samples.

An inference that the value based on the whole population would be within the indicated ranges would be correct in approximately the foregoing frequencies. For example, suppose an estimated employment total is 5,000 with an associated relative error of 2 percent. Based on these data, the standard error is 100 (5,000 x 0.02) and the 68 percent confidence interval is from 4,900 to 5,100 (5,000 ± 100). A conclusion that the actual total employment lies within a range computed in this manner would be correct for roughly 68 percent of all possible samples.

Relative standard errors indicate the potential magnitude of the sampling error but do not measure biases in the data resulting from nonsampling error. Many edit and quality control procedures are used to reduce the biases arising from errors in recording, coding, and processing the data. The adjustments made for nonrespondents assume that their characteristics are the same as those of the respondents in a given 3-digit SIC/State/size-class sampling cell. To the extent that this is not true, bias is introduced into the data. The magnitude of these biases is unknown.

Particular care should be exercised when interpreting estimates based on a small number of cases, or on small differences between estimates, because of relatively large sampling errors and the unknown magnitude of the nonsampling biases. In general, an employment estimate that has a relative standard error of zero (0.0) percent indicates that the estimate has no sampling error. An estimate with a relative standard error of zero (0.0) does not imply that the estimate is perfect, especially since the estimate is also subject to nonsampling error (e.g., nonresponse error).

Quality Control Measures

As noted earlier, the OES Survey is a Federal-State cooperative effort that enables States to conduct their own surveys. A major concern with a cooperative program like OES is accommodating State-specific publication needs with limited resources while standardizing survey procedures across all 50 States and the District of Columbia in order to produce high-quality estimates. The control on sources of nonsampling error in this decentralized environment can be particularly difficult. In addition, the review and validation function is spread across eight Regional Offices, thus leading to procedural differences between regions. Examples of quality control measures employed by BLS are the Survey Processing and Management (SPAM) System and the Estimates Delivery System (EDS), which were developed to provide a consistent and automated framework for State procedures and to reduce the workload at State, regional, and national levels.

By standardizing data processing activities (i.e., validating the sample frame, allocating and selecting the sample, refining mailing addresses, addressing envelopes and mailers, editing and updating questionnaires, producing management reports, and producing estimates) across all States, the use of SPAM and EDS has also standardized the survey methodology. This standardization has significantly reduced the number of errors on the data files as well as the time needed to review them.

Other quality control measures used in the OES survey include the following:

- followup solicitations of nonrespondents (especially critical respondents);
- review of schedules to verify the accuracy and reasonableness of the reported data;
- adjustments of atypical data reports;
- validation of the nonresponse adjustment factors;
- validation of the benchmark employment figures and of the benchmark factors; and
- validation of the analytical tables of estimates (at the 2- and 3-digit SIC levels).